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特許庁

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弁類の保安装置

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図面の簡単な説明

図面は本発明実施の態様を示す系統図である。

発明の詳細な説明

本発明は多数並設した大型弁類を単独または相互関連して作動させることを必要とする場合従来は圧搾空気による気動方式あるいは電気的方法による電気制御方式が採用されているが、前者は配管あるいは装置が複雑となり、後者は停電等によって作動不能となり、例えば加熱炉のような場合には爆発の危険さえ伴う。

本発明はこのような欠点を除去し簡単確実にしかも所要開閉状態を確保し、また作動し得るようにしたもので、その実施例を図面に就いて説明すれば、圧搾空気タンクからフイルター1その他の附帯装置を経て圧搾空気を供給する給気管2に三方電磁弁3および圧搾空気により切替操作が行われる三方気動弁4の各連結口Cに連結し、三方気動弁4の連結口aを共通の弁作動用圧気本管5に連結し、さらに他の連結口bを三方電磁弁3の連結口aに連管6で連結し、三方電磁弁3の他の連結口bはこれを排気口とする。また給気管2から分岐した三方操作弁8の連結口a，bを経て三方気動弁4に至る気動弁操作管7により弁4を圧気本管5と連管6を連結する状態に保持させ、操作室に設置せられる三方操作弁8の他の連結口Cを排気口とする。送気管5に送られた圧搾空気により弁体9_1……9_nを所要の開閉状態に作動させる機構は種々あるが、その一例として三方コック10と筒コックに連通する四方電磁弁11によって弁開放送気管12と、閉合用送気管13の一方を送気管5に、また他方を四方切替弁の排気口14に連通切替え得るようにし、四方電磁弁11は消磁によって所要の圧搾空気通路が形成されるように作ってあるなお図中三方コック10は弁体9を現場手動操作する場合、弁開放送気管12と閉合用送気管13を連通させる均圧弁で、15は所要個所に設けた圧搾空気遮断弁である。

図示の状態では給気管5の圧搾空気は三方操作弁8の連結口a，bを経て三方気動弁4に送られた圧搾空気により三方気動弁4は圧気本管5と連管6を連通状態とし三方電磁弁3により排気口bに連通しているから圧気本管5内の圧力は放出され各弁体9は重錘等によりバランスされ所定位置に停止している。平常時弁体9を作動させる時は電磁弁3の切替えを行うことによって圧搾空気は圧気本管5に送られ各弁体9_1……9_nは四方電磁弁11により予じめ設定された開閉状態に合致した位置を採り三方電磁弁3が切替えられたときにも弁体9は動作せず現状位置を保持する。しかして四方電磁弁11は弁体9の使用目的に従って設定された順序により電気回路により切替えられる。また弁体9の開閉順序の電気的諸鍵を解くことにより四方電磁弁11を単独に作動させ得る。さらに停電時に弁体9の開閉位置が装置全体を安全に保持する状態に成り得る為、四方電磁弁11は消磁にて定められた圧搾空気通路を形成するように設置されている。

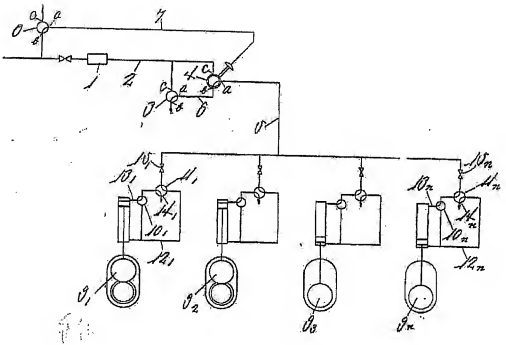
このようにして各弁の操作が終ると各弁の開閉状態を確認する装置により操作が所定通り行われたことを確認した後電磁弁3は消磁されて復元し圧気本管5の空気を排出口bから排出して残圧の影響がないようにする。また停電時に各弁を停電時必要とする所定位置に開閉する必要がある場合には操作室において三方操作弁8を手動により切替え三方気動弁4に至る気動弁操作管7の圧搾空気を排出口Cから排出して気動弁4により圧気本管5を給気管2に連通させることにより、四方電磁弁11は停電消磁により所要の位置へ弁体を作動

させる通路が形成されているから各弁が所要位置へ操作される。次に三方操作弁Bを復元し残圧の影響を除去しておけば送電が開始されても弁体を移動させるような危険が少くなる。

本発明は以上のように常時弁の操作を自由に行い得ると共に停電によつて危険を生ずるような場合にも確実安全な弁の開閉状態に操作することが出来る。

特許請求の範囲

1 本文に詳記し図面に例示するように給気管を弁作動用圧気本管に連通、または弁作動用圧気本管内の送気を排出する三方電磁弁と、弁作動用圧気本管を前記三方電磁弁または給気管に切替連通する三方気動弁とを具え、該三方気動弁は給気管に連結せる気動弁操作管の圧搾空気力により弁作動用圧気本管と三方電磁弁とを連通させ気動操作管の排気により弁作動用圧気本管を給気管に連結させるための三方気動弁を給気管中途に設けたことを特徴とする弁類の保安装置。



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Safety Device for Valves

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Brief Explanation of the Drawing

The drawing is a systemized chart illustrating the mode of carrying out the present invention.

Detailed Explanation of the Invention

When large-sized valves wherein multiple valves are connected in parallel must be operated individually or mutually in conjunction, conventionally, a pneumatic system using compressed air or an electrical control system by an electrical method have been employed, but in the former case, the piping or apparatus become complex, while in the latter case, operation becomes disabled when a power failure occurs. In addition, in the case using a heating furnace, the risk of explosion may be of concern.

The present invention intended to provide a simple and secure method and to secure a desired open/closed state and to be able to operate it by overcoming the drawbacks. An embodiment will be explained below with reference to the drawings. To the air supply pipe 2 supplying compressed air from the compressed air tank via a filter 1 and other associated devices, a 3-way electromagnetic valve 3 and each connection port C of the 3-way pneumatic valve 4 is connected, a connection port a of 3-way pneumatic valve 4 is connected to a common pneumatic main pipe 5 for valve operation, further the other connection port b is connected to the connection port a of the 3-way electromagnetic valve 3 with a connection pipe 6, and the other connection port b of the 3-way electromagnetic valve 3 is used as an exhaust port. Furthermore, using a pneumatic valve operating pipe 7 via connection ports a and b of the 3-way operation valve 8 branched from the air supply pipe 2 to the 3-way pneumatic valve 4, the valve 4 is maintained in a state connecting the pneumatic main pipe 5 and the connection pipe 6, and the other connection port C of the 3-way operation valve 8 set up in the operation room serves as an exhaust port. There are many mechanisms of operating the valve bodies $9_1 \ldots 9_n$ in a desired open/closed state by compressed air carried to the blowing pipe 5. As an example, using a 3-way cock 10 and a 4-way electromagnetic valve 11 connected to the cock, a valve opening blow air pipe 12 and one of the closing blow air pipes 13 can be connected and switched to the blow air pipe 5 and the other to an exhaust port 14 of the 4-way switching valve such that the 4-way electromagnetic valve 11 forms a desirable compression air passage by demagnetizing. In this figure, when manually operating the valve body 9 at the site, the 3-way cock 10 is a pressure equalizing valve connecting

between the valve opening blow air pipe 12 and the closing blow air pipe 13, and 15 is a compression air shutdown valve installed at the desired position.

In the state shown in the chart, in the compressed air in the supply air pipe 5 due to the compressed air carried via connection ports a and b of the 3-way operation valve 8, the 3-way pneumatic valve 4 makes the pneumatic main pipe 5 and the connection pipe 8 in a connected state and is connected to the exhaust port b by the 3-way electromagnetic pipe 3 so that the pressure in the pneumatic main pipe 5 is released and each valve body is stopped at the specified position due to a balance using a weight, etc. When operating the valve body in general, the compressed air is carried to the pneumatic main pipe by switching the electromagnetic valve 6 so that each valve body 9_1 .....9_n takes the position matching with the open/closed state that is set up in advance with the 4-way electromagnetic valve 11, and even when the 3-way electromagnetic valve 3 is switched, the valve body 9 does not move and maintains the current position. Thus, the 4-way electromagnetic valve 11 is switched by the electrical circuit in the order set up according to the purpose of use of the valve body 9. Further, by electrically suppressing the order of opening/closing of the valve body 9, the 4-way electromagnetic valve can be operated independently. Further, since at the time of power failure, the opening and closing position of the valve body 9 becomes in such a state that the entire device can be maintained safely, the 4-way electromagnetic valve 11 is set up such that a compressed air passage is formed by demagnetizing.

When the operation of each valve is completed, the fact that the operations are carried out as specified is confirmed by the devices for checking the open/closed state of each valve, and then the electromagnetic value 3 is demagnetized to be restored, and the air in

the pneumatic main pipe 5 is exhausted from the exhaust port b so that there is no effect of residual pressure. Further, if it is necessary to open and close each valve at the time of power failure at the specified positions required at the time of power failure, the 3-way operation valve 8 is switched manually in the operation room so that the compressed air of the pneumatic valve operating pipe 7 reaching the 3-way pneumatic valve 4 is exhausted from the exhaust port C and the pneumatic main pipe 5 is connected to the supply air pipe 2 with the pneumatic valve 4, and since a passage is formed such that the 4-way electromagnetic value 11 moves the valve body to a desired position by demagnetizing at the time of power failure, each valve is operated at the desired positions. Next, if the 3-way operation valve 8 is restored to remove the effect of residual pressure, there is no risk of moving the valve body when power is restarted.

As mentioned above, according to the present invention, operation of valves can be always performed freely and even in the case when there is a danger due to power failure, valves can be operated securely and safely in the open/closed state.

Scope of the claim:

1. As described in the specification with reference to the drawing, a safety device for valves characterized in that it comprises a 3-way electromagnetic valve connecting the supply air pipe to the pneumatic main pipe for valve operation which exhausts blown air in the pneumatic main pipe for valve operation, and a 3-way pneumatic valve switching/connecting the pneumatic main pipe for valve operation to said 3-way electromagnetic valve or the supply air pipe, and a 3-way pneumatic valve is equipped in the middle of the supply air pipe such that the 3-way pneumatic valve connects the pneumatic main pipe for valve operation and the 3-way electromagnetic valve due to the compressed air force of the pneumatic valve operation pipe connected to the supply air pipe and the pneumatic main pipe for valve operation is connected to the supply air pipe by exhausting the pneumatic operation pipe.